

Research Article

Pattern of Utilization of Blood and Blood Products in a Tertiary Care Hospital

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A B S T R A C T

Background: Blood banks should be aimed at high quality of transfusion practices in terms of standard practices from screening of donors, collection, separation and issue of blood and blood products. Regular transfusion audits should be carried out in the blood bank to know the utilization trends.

Aims and Objectives: To study the utilization pattern of blood and blood components in a tertiary care hospital.

Materials and Methods: It was a retrospective cross-sectional study carried out at the blood bank of a tertiary care hospital for a period of three years from 2015-2017. Details of collection of whole blood, preparation of components, departments requesting blood products were collected from the records of the blood bank. Data entered in excel and frequency and distribution of variables were calculated.

Result: A total of 10072 blood components were prepared during the study period of three years. Out of the 2372 whole blood collected during the study period, 1981 (83.5%) were utilized. Out of the 4961 components prepared, 4726 (95.3%) of packed cells, 2942 (59.3%) of platelets, 4516 (91%) of Fresh frozen plasma was utilized. During the study period, Obstetrics and Gynecology department requested 3610 (35.8%) blood products, followed by Orthopedics department 2098 (20.8%).

Conclusion: Every blood bank should audit the pattern of utilization of blood and blood products which can serve as an internal quality control for the effective functioning of blood bank. A good communication between the clinicians and the blood bank personnel will minimize the inappropriate usage of blood and blood products.

Keywords: Blood Components, Internal Quality Control, Transfusion Practices, Transfusion Audits, Utilisation Pattern

Introduction

Blood is a precious resource and it has to be utilized

judiciously. Blood banks should be aimed at high quality of transfusion practices in terms of standard practices from

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screening of donors, collection, separation and issue of blood and blood products. Regular transfusion audits should be carried out in the blood bank to know the utilization trends. Unnecessary transfusions may contribute to shortage of blood products and each indication for requisition of blood products should be justified.¹ Appropriate usage of blood components minimizes the cost of transfusion, adverse reactions of transfusions.² Thus effective utilization of blood products plays a key role in the quality assurance of transfusion services. Interventions should be designed to modify the transfusion practices; thus, periodic revision of existing guidelines can be made to improve the transfusion practices.³ Thus this study was aimed to study the utilization pattern of blood and blood components in a tertiary care hospital.

Materials and Methods

The study was a retrospective cross-sectional study carried out at the registered blood bank of Sri Manakula Vinayagar medical college and hospital, a tertiary care centre in rural puducherry, for a period of three years from January 2015 to December 2017. Details of monthly collection of whole

blood, preparation of components were collected from the blood bank registers. Details of the departments requesting blood products were also collected from the requisition forms of the blood bank. The entire data was collected and there were no exclusion criteria. The data was entered in excel sheet and frequency and distribution of variables were calculated.

Result

A total of 10072 blood components were prepared during the study period of three years. Out of the 2372 whole blood collected during the study period, 1981 (83.5%) were utilized. Out of the 4961 components prepared, including, Packed red cells, platelets, Fresh frozen plasma, 4726 (95.3%) of packed cells, 2942 (59.3%) of platelets, 4516 (91%) of Fresh frozen plasma was utilized. Thus a total of 14,165 whole blood and blood components were utilized during the study period. The year wise of split of number of whole bloods, packed cells, platelets, fresh frozen plasma prepared during the study period and their utilization (Table 1).

Table 1. Blood and blood products collected and utilized during the study period

Year	Whole Blood		Packed red cells		Platelets		Fresh frozen plasma	
	C	U	C	U	C	U	C	U
2015	758	604 (79.7)	1215	1141 (93.9)	1215	530 (43.6)	1215	1117 (91.9)
2016	898	822 (91.5)	1342	1257 (93.7)	1342	764 (56.9)	1342	1175 (87.6)
2017	716	555 (77.5)	2404	2328 (96.8)	2404	1648 (68.6)	2404	2224 (92.5)
Total	2372 (100)	1981 (83.5)	4961 (100)	4726 (95.3)	4961 (100)	2942 (59.3)	4961 (100)	4516 (91)

C – collected; U – utilized.

Table 2. Department wise pattern of requisition of blood and blood product during the study period

Department	2015	2016	2017	Total
Medicine	339 (11.8%)	317 (10.2%)	427 (10.38%)	1083 (10.75)
Surgery	439 (15.32)	583 (18.8%)	805 (19.57%)	1827 (18.13)
Obstetrics	1025 (35.7%)	1113 (35.9%)	1472 (35.79%)	3610 (35.84)
Orthopedics	675 (23.5%)	632 (20.4%)	791 (19.23%)	2098 (20.83)
Paediatrics	10 (0.34%)	21 (0.67%)	32 (0.77%)	63 (0.62)
Urology	58 (2.02%)	88 (2.84%)	126 (3.06)	272 (2.71)
Nephrology	5 (0.17%)	24 (0.77%)	39 (0.95%)	68 (0.67)
Neurosurgery	3 (0.10%)	4 (0.12%)	9 (0.21%)	16 (0.15)
ENT	55 (1.9%)	79 (2.55%)	47 (1.14%)	181 (1.79)
Ophthalmology	3 (0.10%)	2 (0.06%)	3 (0.07%)	8 (0.07)
Casualty	59 (2.05%)	63 (2.03%)	102 (2.48%)	224 (2.22)
ICCU	156 (5.44%)	153 (4.94%)	245 (5.95%)	554 (5.50)
PICU/NICU	38 (1.32%)	16 (0.51%)	14 (0.34%)	68 (0.67)
Total	2865	3095	4112	10072

Out of the total 10072 blood and blood products collected during the study period, 2865 products were collected in 2015, 3095 products in 2016, 4112 products in 2017. In all the three years Obstetrics and Gynecology department requested 3610 (35.8%) products, followed by Orthopedics department 2098 (20.8%) blood products and surgery department 1827 (18.1%) blood products. Medicine department requested 1083 (10.7%) blood products during the study period. The intensive care units requested 622 (6.1%) blood products [ICCU - 554 (5.5%) blood products and PICU/ NICU - 68 (0.67%) blood products]. The department wise requisition of blood products and their year wise split up is shown in Table.2. The most common indication for the indication of the transfusion was for surgeries, followed by anemia and labour and other gynecological procedures.

Discussion

Blood and blood products are considered as Drug by the Food and Drug Administration (FDA). Component therapy serves to be beneficial to several patients as the components prepared from the single unit of whole blood can cater diverse indications of transfusions. As with any other treatment modality, blood transfusion carries its own risks and blood should be transfused only if benefit outweighs risks.⁴

Hence blood products should be transfused only when the indication is appropriate as inappropriate transfusions can result in wastage of precious blood products, other resources in terms of man power, time and other health care costs. More over the needy patients are deprived of the blood products and the other end the transfused patients are exposed to the risk of transfusion transmissible infections and allergic reactions.^{5,6}

Several indices have been suggested by the researchers to evaluate the effective utilization of blood products and enhanced quality of transfusion services. Henry suggested that Cross match to transfusion ratio (C/ T) can be used to evaluate the transfusion services⁷ and a C/ T ratio of 1 is ideal and in routine practices a C/ T ratio of less than or equal to 2.5 can be considered.⁸ Mead JH et al.⁹ suggested Transfusion probability can be used to evaluate the transfusion service and a transfusion probability of 30% and above can be considered as appropriate.⁸ Transfusion index is the average number of units transfused per patient crossmatch and a value of 0.5 is suggestive of effective blood usage.^{7,8}

Institutional policies should be formulated for ordering blood products to the blood bank and this has to be framed at the hospital transfusion committee meetings by the blood bank personnel and the ordering clinicians (Heads of the relevant departments). Regular interdepartmental clinicopathological meets and discussion of the transfusion guidelines with the resident doctors and clinicians can

minimize the unnecessary blood requests. Strict protocols have to be formulated and followed to minimize the unwanted cross matches thus the wastage of blood products due to expiry can be avoided.

Requisition of packed red blood cells should be based on low hemoglobin and low hematocrit as well as the clinical symptoms of the patient. Transfusions of packed cells can be inappropriate in conditions where the patient is asymptomatic and the hemoglobin is more than 7 g/ dl and during preoperative transfusion to raise the patient's hemoglobin to more than 10 g/dl.¹¹ Formulation of evidence-based transfusion guidelines in such conditions can rationalize the effective utilization of blood.¹¹

Hemostatic defect arising because of deficiency of clotting factors can be corrected by transfusing 5-6 units of FFP.¹² Many centers report varying rates of inappropriate transfusion of FFP¹³⁻¹⁵ and it has been formulated that a sudden reduction in the usage of whole blood would have led to the more inappropriate usage of FFP.¹⁶ A misconception of FFP as a volume expander leads to its use in bleeding cases even without derangement of clotting parameters. Hence a defective coagulation has to be determined before the requisition of FFP.¹⁰ Many studies^{17,18} report over prescription of FFP at the national and international levels and strict clinical criteria has to be enforced by sufficing the values of Partial Thromboplastin Time (PT), Activated Partial Thromboplastin Time (APTT) and International Normalized Ratio (INR) with every request of FFP made to the blood bank.¹⁰

Prophylactic transfusions of platelets should be considered to keep the platelet count above $10 \times 10^9/L$ to prevent risk of life threatening hemorrhage.¹⁹ However, in the presence of infection, chemotherapy and potential surgical bleeding sites aiming a platelet count of 20×10^9 is justified.²⁰ Hence before requesting platelets for transfusions, clinicians should weigh the appropriateness of the indications for the transfusion with the risk associated with platelet transfusions and the challenge of maintain the adequate stock in the blood bank.²¹ Recent years has witnessed the multifold usage of platelet concentrates.²² While this has increased the effective management of patient with neoplastic and non-neoplastic indications for platelet transfusion, the inappropriate usage of platelets is also on the rise.²³

Blood banks has the responsibility to fulfill the requirements of the blood products to the patients as well as to assess the pattern of ordering of blood products and their utilization. As, there is variation in the utilization of blood components by different departments, periodic audits and effective communication between blood bank personnel and clinicians will prevent the inappropriate usage of this precious resource.

Conclusion

Every blood bank should audit the pattern of utilization of blood and blood products which can serve as an internal quality control for the effective functioning of blood bank. Periodic reviews will also help to formulate and implement standard guidelines for transfusion practices. A good communication between the clinicians and the blood bank personnel will minimize the inappropriate usage of blood and blood products. These efforts will fulfill the existing demand of blood products to some extent and prevent the unwanted wastage of blood and blood products.

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Conflict of Interest: None

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